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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/556,607	04/21/2000	Arthur Joseph Kalb	135469-200200 (P04342)	6834

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EXAMINER
BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
2631	7

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/556,607	KALB, ARTHUR JOSEPH	
	Examiner	Art Unit	
	Emmanuel Bayard	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paul U.S. Patent No 6,198,417 B1 in view of Lewison U.S. Patent No 5,933,453.

As per claims 1, 20 and 39 Paul discloses an apparatus including a circuit for converting an analog signal to a pulse width modulated signal comprising: an integration stage (see figs. 1, 4, 9, 11 elements 106, 412, 908, 906. 1106, 1108 and col.1, line 27 and col.2, lines 26-30 and col.6, lines 55-56 and col.7, lines 1-6) configured to receive combine and integrate an analog input signal and a set of one or more feedback signals and in accordance therewith provide a set of one or more integrated signals; a modulation stage, (see figs. 1, 4, 9, 11 elements 102, 402, 902, 1102 and col.1, line 25 and col.2, line 25 and col.6, line 54 and col.10, line 14) coupled to said integration stage, configured to receive and modulate a final portion of said set of one or more integrated signals and in accordance therewith provide a discrete time (see col.1, lines 25-26); a first feedback stage, coupled between said modulation stage and said integration stage, configured to receive said discrete time in accordance therewith provide a first portion of said set of one or more feedback signals.

However Paul does not teach a modulation stage to provide a discrete time **pulse width modulation signal**.

Lewison teaches a modulation to provide a discrete time pulse width modulation (see fig.2 element 205 and col.4, lines 2-45 and col.5, lines 1-20).

It would have been obvious to one of ordinary skill in the art to implement the pulse width modulation of Lewison into Paul as to determine the effective uncorrected duty cycle of the PWM waveform for the next period as taught by Lewison (see col.4, lines 7-15).

As per claims 2, 21 and 40 the apparatus of Paul does include an adder and an integration stage (see figs. 1, 4, 9, 11 and col.2, lines 29-30 and col.7, line 20 and col.8, lines 22-30 and col.10, line 24).

As per claims 3, 22 and 41 the apparatus of Paul does include a feed forward circuit (see col.6, line 60 and col.10, line 21).

As per claims 4, 23 and 42 the apparatus of Paul does include an integration stage. Furthermore implementing such integration to be a continuous time integrator would have been obvious to one skilled in the art so that a sigma delta modulator could convert the continuous time into discrete time.

As per claims 5, 24 and 43 the apparatus of Paul does include at least one sampled integrator circuit (see fig.8 element 802 and col.6, lines 17-19 and col.8, lines 30-32).

As per claims 6, 7, 25, 26 and 44-45, the apparatus of Paul does include a quantization stage (see abstract). Furthermore implementing the quantization to be coupled to a pulse width modulation would have been obvious to one skilled in the art so as to compute at least one bit of each pulse width modulation signal.

As per claims 8, 27 and 46, It would have been obvious to one of ordinary skill in the art to implement the pulse width modulation of Lewison into Paul as to determine the effective uncorrected duty cycle of the PWM waveform for the next period as taught by Lewison (see

col.4, lines 7-15).

As per claims 9, 28 and 47-49 the apparatus of Paul does include a first feedback stage. Furthermore implementing such feedback stage to be a continuous time feedback circuit would have been obvious to one skilled in the art so that a sigma delta modulator could convert the continuous time into discrete time.

As per claim 10, the apparatus of Paul does include a first feedback stage having a discrete time (see col.1, line 25).

As per claims 11, 29-30 the apparatus of Paul does include a first feedback stage. Furthermore implementing an anti-aliasing stage filter into the first feedback stage would have been obvious to one skilled in the art as to eliminate or reduce errors in the pulse width modulation signals.

As per claims 12, 31 and 50 the apparatus of Paul does include a second feedback stage and a quantization stage and a integration stage (see figs. 1, 4, 9, 11 and see abstract and col.3, lines 42-49).

As per claims 13, 32 and 51 the apparatus of Paul does include a first adder, a second adder and an integration stage (see figs. 1, 4, 9, 11).

As per claims 14, 33 and 52 the apparatus of Paul does include an integration stage. Furthermore implementing such integration to be a continuous time integrator would have been obvious to one skilled in the art so that a sigma delta modulator could convert the continuous time into discrete time.

As per claims 15, 16, 34-35 and 53-54 the apparatus of Paul does include a quantization stage (see abstract). Furthermore implementing the quantization to be coupled to a pulse width modulation would have been obvious to one skilled in the art so as to compute at least one bit of

each pulse width modulation signal.

As per claims 17, 36 and 55, it would have been obvious to one of ordinary skill in the art to implement the pulse width modulation of Lewison into Paul as to determine the effective uncorrected duty cycle of the PWM waveform for the next period as taught by Lewison (see col.4, lines 7-15).

As per claims 18, 37 the apparatus of Paul does include a first feedback stage. Furthermore implementing such feedback stage to be a continuous time feedback circuit would have been obvious to one skilled in the art so that a sigma delta modulator could convert the continuous time into discrete time.

As per claims 19, 38 and 56-57 the apparatus of Paul does include a first feedback stage and a second feedback stage coupled to a digital to analog conversion stage. Furthermore implementing an anti-aliasing stage filter into the first feedback stage would have been obvious to one skilled in the art as to eliminate or reduce errors in the pulse width modulation signals.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Groshong U.S. Patent 6,218,972 teaches a tunable bandpass sigma delta digital receiver.

Hoffman U.S. Patent No 5,457,435 teaches a pulse width modulated driver.

Midya U.S. patent No 5,905,407 teaches a high efficiency power amplifier.

O'Brien U.S. Patent No 6,107,876 teaches a digital input switching audio power amplifier.

Zierhofer U.S. Patent o 6,535,153 B1 teaches an adaptive sigma delta modulation.

Lai et al U.S. patent No 5,886,586 teaches a general constant frequency pulse width modulators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham, can be reached on (703) 305-4378. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Emmanuel Bayard

Primary Examiner

June 9, 2003